

The Acoustic Relaxation of Aqueous Solutions of Triton X-100

B. Yeleussinov, V. Sperkach, and Y. Sperkach
Physics Department, Kyiv Taras Shevchenko University
6 Pr. Glushkova
Kyiv, 252127, Ukraine

We have studied aqueous solutions of the nonionic surfactant Triton X-100 over the temperature range from 278 to 343 K with acoustic spectroscopy and rheology. The density of the solution (ρ) was determined with a picnometr, and the shear viscosity (η_s) was measured with a capillary viscosimeter. The amplitude coefficient of the sound absorption (α) was determined by the pulse method with a variable pathlength. The velocity of sound (c) was measured at a frequency of 5 MHz.

The dynamics of the exchange process for a surfactant monomer between the micelle and bulk solution has been extensively studied by many investigators using the ultrasonic relaxation technique. The results of these studies have been quantitatively analyzed by applying a general model of the micelle formation proposed by Aniansson and Wall. However, the dynamical and kinetic aspects of the micell/monomer exchange process are not easily analyzed.

The results of our experiments show that the process of acoustic relaxation is not observed in dilute solutions Triton X-100. Two regions of acoustic relaxation are observed big surfactant concentrations and the relaxation parameters were calculated.